

Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 1, wherein a numerical formula is added to the figure to show a relationship between WL and WS. This sheet, which includes Fig. 1, replaces the original sheet including Fig. 1.

Attachment: Replacement Sheet

REMARKS

By the present amendment, claim 1 has been amended to provide antecedent basis for "the driving means" while clarifying the feature that wherein the control means determines rectangular spiral travel paths based on an orientation angle detected by the orientation angle detection means and causes the cleaning device to travel along the rectangular spiral travel paths for cleaning a room including travel alongside the wall surface which partitions the room to be cleaned and which is detected by the wall surface detection means. Further, new dependent claims 15 - 21 have been presented wherein claims 15 and 16, which depend directly or indirectly from independent claim 1, more particularly describe the spiral travel path and claims 17 - 21, depend from claims 1, 5, 6, 13 and 14 and more particularly define the spiral travel paths as being in the form of continuous loops which at least partially overlap with each other, as clearly illustrated in Fig. 1.

The self-propelled cleaning device of the present invention is further characterized, as depicted in Figure 2 for example (but not to be limiting), by a moving means 5a, 5b for moving the cleaning device, a control means 7 for controlling the moving means an orientation angle detection means 11 for detecting the orientation angle of the cleaning device and a wall surface detection means 12 which is capable of detecting a wall surface at a position on one side of the cleaning device, so that when the control means causes the cleaning device to travel alongside a wall surface detected by the wall surface detection means that partitions the room to be cleaned, rectangular spiral travel paths are determined based on an orientation angle detected by the orientation angle detection means, and the driving means drives the cleaning device such that it moves along this travel path.

Applicants submit that the aforementioned features are now set forth in the

independent and dependent claims of this application and are not disclosed or taught in the cited art, as will become clear from the following discussion.

In response to the Objection to the Drawings, applicants have submitted a replacement sheet of drawing of amended Figure 1 to show the relationship between WL and WS and have amended the Specification at page 15, starting at line 7 to describe the relationship between WL and WS in algebraic form. Accordingly, acceptance of the replacement sheet of drawing is requested.

Before proceeding to the rejection based on prior art, applicants note that dependent claim 10 does not stand rejected in the office action, in that there is no statement of a ground of rejection, as required by 35 USC 132 and 37 CFR 1.104(c). Thus, in the absence of a statement of rejection of claim 10, such claim is considered allowable.

In response to the rejection of claims 1-9 under 35 USC 102(b) as being unpatentable over Hwang et al (US 5568589) and the rejection of claims 11-14 under 35 USC 103(a) as being unpatentable over Hwang et al ('589); such rejections are traversed insofar as they are applicable to the claims, as amended, and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 USC 102, reference is made to the decision of In re Robertson, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. As noted by the court, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing

descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." Moreover, the court pointed out that inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

Turning to the rejection of claim 1, applicants assert that the features of newly amended independent claim 1 are not disclosed or taught by Hwang ('589). Specifically, Hwang does not disclose or teach a self-propelled cleaning device comprising rectangular spiral travel paths, as disclosed in applicants' specification at page 8, lines 27-28, page 10, lines 2-5, and page 21, lines 2-6 for example. Rather, Hwang ('589) discloses a self-propelled cleaning machine that follows a PATH2 as shown in Figs. 5C and 5D, defined by connecting the ends of the parallel lines in alternating directions to define a running path for the cleaning machine, as described in column 6, lines 53-57 of Hwang. The running path of Hwang does not continue in rectangular spiral paths as recited claim 1, nor does the running path of Hwang comprise rectangular spiral travel paths in the form of continuous loops that partially overlap with each other as recited in new dependent claim 17. Rather, the running path of Hwang runs mainly in parallel lines, in a zig-zag fashion, connected at distant ends thereof. Therefore, the device of Hwang is not able to achieve the beneficial aims of the present invention by using the spiral motion coupled with the first and second vertical movement paths and the first and second horizontal paths, wherein the second horizontal movement path moves a distance shorter than the first horizontal movement path to create the spiral motion, as recited in dependent claim 15 such that an approach path and a return path of the cleaning device do not overlap, and there is no multiple cleaning of the same region, as described, for

example at page 19, line 28 to page 20, line 9 of the specification. Thus, applicants submit that claim 1 and dependent claims 2-4 and 17 patentably distinguish over Hwang and should be considered allowable thereover.

In regard to claim 5, Hwang does not disclose or teach a plurality of looped travel paths including travel routes along a pair of opposing wall surfaces. On the contrary, the travel paths of the cleaning device of Hwang, as shown in Fig. 5D of Hwang, follow a zig-zag type parallel alignment. There is no disclosure or teaching that the cleaning machine follows the path of a plurality of loops, as is shown in Fig. 1 of applicants' specification. Moreover, Hwang does not disclose or teach the subject matter of dependent claim 18, wherein the plurality of travel paths partially overlap with each other. Additionally, the Examiner does not specify how Hwang relates to the recited claimed features of detecting a reference direction for the propelled cleaning device on at least one of the travel routes along the wall surface and determining a travel path other than the travel routes along the wall surface based on the reference direction. Such features are not taught by Hwang as cited by the Examiner in column 6, starting at line 40, for example, wherein after the cleaning machine has gone around the periphery of the AREA1, the CPU determines an AREA2 to be cleaned (lines 45-46), and parallel lines are defined in the cleaning area AREA2 (lines 49-52). Thus, the travel routes of the device of Hwang are already set, and as emphasized in Hwang, column 6, lines 61-63 and the cleaning machine is controlled to run along the cleaning running path PATH2 without deviation. Thus, this reference does not disclose or teach the claimed feature of a method of determining a travel path other than the travel routes along the wall surface based on the reference direction, as described in applicants' specification, for example, at page 14, line 13 to page 15, line 7. Thus, applicants submit that

claim 5 and the dependent claims 11-12 and 18 patentably distinguish over Hwang and should be considered allowable thereover.

In regards to independent claim 6, the Examiner asserts that Hwang discloses making a plurality of spiral travel turns across the room perimeter. Without acquiescing to the propriety of that assertion, applicants note that the Examiner has not asserted that Hwang discloses or teaches the feature of a method of operation for a self-propelled cleaning device wherein the cleaning takes a plurality of spiral travel paths which partially overlap each other, or which are in the form of continuous loops which at least partially overlap with each other, as recited in new dependent 19. Thus, the Examiner has not shown under 35 USC 102(b) that the prior art discloses or teaches each and every element as set forth in the claim. Additionally, as discussed above in regards to independent claim 1, the prior art of Hwang does not disclose cleaning paths that extend in rectangular spiral paths with travel paths that partially overlap each other. Rather, as shown in Figs. 5C and 5D of Hwang, the cleaning paths extend in a zig-zag parallel fashion, and are configured not to deviate from this arrangement, as described in Hwang at column 7, lines 8-18. Thus, applicants submit that claim 6 and the dependent claims 7-10 and 19 patentably distinguish over Hwang and should be considered allowable thereover.

To establish *prima facie* obviousness of a claimed invention under 35 USC 103, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). MPEP 2143.03.

In regards to claims 13 and 14, the Examiner asserts that Hwang discloses a method for operating a self-propelled cleaning device which uses a wall surface detection means, but does not assert that Hwang discloses, teaches, or suggests using an orientation angle detection means. Therefore, the Examiner has not

satisfied the burden under 35 USC 103 in which all the claim limitations must be taught or suggested by the prior art. Hwang does not disclose, teach, or suggest an orientation angle detection means as disclosed in applicants' specification at page 7, line 21 to page 8, line 4, for example, and page 23, lines 9-14, for example (but not to be limiting). Moreover, Hwang does not disclose or teach the features concerning operations based upon equality as recited in claims 13 and 14. Furthermore, Hwang does not disclose or teach the features concerning continuous loops which at least partially overlap each other as recited in new dependent claims 20 and 21. Therefore, applicants submit that claims 13, 14, 20 and 21 patentably distinguish over Hwang and should be considered allowable thereover.

In view of the above amendments and remarks, applicants submit that all claims 1 – 20 present in this application should now be in condition for allowance and issuance of an action of favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 503.43666X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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